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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/026,146	12/21/2001	Richard P. Volant	FIS920010219US1	8227

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EXAMINER	
VU, HUNG K	

ART UNIT	PAPER NUMBER
2811	

DATE MAILED: 03/12/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/026,146	VOLANT ET AL.	
	Examiner	Art Unit	
	Hung K. Vu	2811	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12/23/03*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-15* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-15* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Request for Continued Examination

1 A request for continued examination (RCE) under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant' submission filed on 12/23/03 has been entered. An action on the RCE follows.

Claim Objections

2. Claim 7 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Note that the independent claim 1 defines the third electrical conductor has a thickness in a range of approximately two and one-half to less than five microns, but the dependent claim 7 defines the thickness in an additional range of approximately five to approximately 10 microns.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1, 4 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhao et al. (PN 5,861,647, of record).

Zhao et al. discloses, as shown in Figures 7 and 8, a passive electrical device comprising:

a first electrical conductor (20);

a second electrical conductor (52) disposed over the first electrical conductor;

a third electrical conductor (48) connecting the first electrical conductor to the second electrical conductor, wherein the first, second and third electrical conductors are disposed on a semiconductor substrate (28,30) and wherein the sheet resistivity of the first electrical conductor is approximately equal to the sheet resistivity of the second electrical conductor. Note that the first and the second electrical conductors comprise the same material, it is inherent that the sheet resistivity of the first electrical conductor is approximately equal to that of the second electrical conductor [see Col. 3, lines 2-6 and 56-57];

wherein the third electrical conductor consists essentially of one substantially uniform chemical composition (tungsten, aluminum or copper) [see Col. 3, lines 40-41].

Zhao et al. discloses the third electrical conductor has a thickness in a range of 2.3 microns (within the range of approximately two to less than five microns) [see Col. 3, lines 23-27, note that the third electrical conductor 48 is formed in the dielectric layer 36 which is the combination of layers 38, 40 and 42, having the thickness as claimed]. Zhao et al. does not disclose the third electrical conductor has the thickness in a range of approximately two and one-half to less than five microns. Although Zhao et al. does not teach the thickness of the third electrical conductor, as that claimed by Applicants, however, it would have been obvious to one having ordinary skill

in the art at the time the invention was made to form the third electrical conductor having a desired thickness, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

With regard to claim 4, Zhao et al. discloses the first, second and third electrical conductors consist essentially of copper [see Col. 3, lines 2-6, 39-43 and 56-57].

With regard to claim 5, Zhao et al. discloses the first and third electrical conductors consist essentially of copper, and the second electrical conductor consists essentially of aluminum [see Col. 3, lines 2-6, 39-43 and 56-57].

4. Claims 1-4 and 6-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wen et al. (PN 6,083,802, of record).

Wen et al. discloses, as shown in Figures 12 and 13, a passive electrical device comprising:

a first electrical conductor (20);

a second electrical conductor (28) disposed over the first electrical conductor;

a third electrical conductor (26) connecting the first electrical conductor to the second electrical conductor, wherein the first, second and third electrical conductors are disposed on a semiconductor substrate (14) and wherein the sheet resistivity of the first electrical conductor is approximately equal to the sheet resistivity of the second electrical conductor. Note that the first and the second electrical conductors comprise the same material (copper), it is inherent that the

sheet resistivity of the first electrical conductor is approximately equal to that of the second electrical conductor [see Col. 3, lines 5-14 and 53-65],

wherein the third electrical conductor consists essentially of one substantially uniform chemical composition (tungsten, aluminum or copper) [see Col. 3, lines 55-57].

Wen et al. discloses the third electrical conductor has a thickness in a range of approximately 5 to 10 microns [see Col. 3, lines 39-41, note that the third electrical conductor 26 is formed in the dielectric layer 24 having the thickness as claimed]. Wen et al. does not disclose the thickness of the third electrical conductor is approximately two and one-half to less than five microns. Although Wen et al. does not teach the thickness of the third electrical conductor, as that claimed by Applicants, however, it would have been obvious to one having ordinary skill in the art at the time the invention was made to form the third electrical conductor having a desired thickness, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

With regard to claim 2, Wen et al. discloses each of the first, second and third electrical conductors has a respective thickness, and the thickness of the first electrical conductor is approximately equal to the thickness of the second electrical conductor [see Col. 3, lines 5-14 and 53-65].

With regard to claim 3, Wen et al. discloses each of the first, second and third electrical conductors has a respective thickness, and the thickness of the first conductor is approximately

equal to the thickness of the second electrical conductor and being approximately one-half the thickness of the third electrical conductor.

With regard to claim 4, Wen et al. discloses the first, second and third electrical conductors consist essentially of copper [see Col. 3, lines 5-14 and 53-65].

With regard to claim 6, Wen et al. discloses each of the first and second electrical conductors has a respective thickness in a range of approximately five to 20 microns (within the range of approximately two to approximately 32 microns) [see Col. 3, lines 5-14 and 53-65].

With regard to claim 7, Wen et al. discloses the third electrical conductor has the thickness in a range of approximately five to 10 microns (within the range of approximately two to approximately ten microns) [see Col. 3, lines 34-41, note that the third conductor 26 is formed in the dielectric layer 24 having the thickness as claimed].

5. Claims 5 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wen et al. (PN 6,083,802, of record) in view of Zhao et al. (PN 5,861,647, of record).

With regard to claim 5, Wen et al. taught the invention substantially as claimed, including the passive electrical device as cited in the rejection of claim above. Wen et al. also taught the first, second and third electrical conductors consist essentially of copper. Wen et al. did not specifically teach the second electrical conductor consists essentially of aluminum. However, Zhao et al. taught a second electrically conductor (52) consists essentially of aluminum or copper

[see Figures 8-9, Col. 3, lines 56-57]. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to form the second electrical conductor of Wen et al. consists essentially of aluminum, such as taught by Zhao et al. because aluminum and copper are commonly used to form the conductor for they have lower resistance, and they are interchangeable.

With regard to claim 8, Wen et al. discloses the second electrical conductor has a substantially uniform thickness in a range of approximately five to 20 microns (within the range of approximately four to approximately six microns) [see Col. 3, lines 5-14 and 53-65].

6. Claims 9-11 and 13-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wen et al. (PN 6,083,802, of record) in view of Johnson et al. (PN 6,534,374, of record).
With regard to claim 9, Wen et al., as shown in Figure 3 and 13, the inductor device comprising:

a semiconductor substrate (14);

first, second and third electrical conductors (24,26,28) provided on the substrate, wherein the first and second electrical conductors each has a thickness which is approximately equal [see Figures 3 and 13, Col. 3, lines 12-14 and 61-64],

wherein the third electrical conductor consists essentially of one substantially uniform chemical composition (tungsten, aluminum or copper) [see Col. 3, lines 55-57].
Wen et al. discloses the third electrical conductor has a thickness in a range of approximately 5 to 10 microns [see Col. 3, lines 39-41, note that the third electrical conductor 26 is formed in the dielectric layer 24 having the thickness as claimed]. Wen et al. does not disclose the thickness of

the third electrical conductor is approximately two and one-half to less than five microns. Although Wen et al. does not teach the thickness of the third electrical conductor, as that claimed by Applicants, however, it would have been obvious to one having ordinary skill in the art at the time the invention was made to form the third electrical conductor having a desired thickness, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).
Wen et al. did not specifically teach the semiconductor substrate comprises silicon. However, Johnson et al. taught a semiconductor substrate (20) comprises silicon [see Figures 10 and 16, and Col. 5, lines 2-6]. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to form the semiconductor substrate of Wen et al. comprising silicon, such as taught by Johnson et al. because silicon is one of the materials that is commonly used to form the substrate.

With regard to claim 10, Wen et al. and Johnson et al. taught the substrate comprises silicon and germanium [see Col. 5, lines 2-6].

With regard to claim 11, Wen et al. and Johnson et al. taught the substrate comprises silicon on insulator substrate [see Col. 5, lines 2-6].

With regard to claim 13, Wen et al. and Johnson et al. taught the second electrical conductor is disposed over the first electric conductor [see Figures 8 and 13].

With regard to claim 14, Wen et al. and Johnson et al. taught the first and second electrical conductors are spiral shaped [see Figure 2].

With regard to claim 15, Wen et al. and Johnson et al. taught each of the first and the second electrical conductors has a sheet resistivity, the sheet resistivity of the first electrical conductor being approximately equal to the sheet resistivity of the second electrical conductor. Note that the first and the second conductors comprise the same material (copper), it is inherent that the sheet resistivity of the first conductor is approximately equal to that of the second conductor [see Col. 3, lines 5-14 and 53-65].

7. Claims 9, 12, 13 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wen et al. (PN 6,083,802, of record) in view of Ito (PN 4,758,896, of record).

With regard to claim 9, Wen et al. taught the invention substantially as claimed, including the inductor device, the inductor device comprising:

a semiconductor substrate (14);

first, second and third electrical conductors (24,26,28) provided on the substrate, wherein the first and second electrical conductors each has a thickness which is approximately equal [see Figures 3 and 13, Col. 3, lines 12-14 and 61-64],

wherein the third electrical conductor consists essentially of one substantially uniform chemical composition (tungsten, aluminum or copper) [see Col. 3, lines 55-57].

Wen et al. discloses the third electrical conductor has a thickness in a range of approximately 5 to 10 microns [see Col. 3, lines 39-41, note that the third electrical conductor 26 is formed in the

dielectric layer 24 having the thickness as claimed]. Wen et al. does not disclose the thickness of the third electrical conductor is approximately two and one-half to less than five microns. Although Wen et al. does not teach the thickness of the third electrical conductor, as that claimed by Applicants, however, it would have been obvious to one having ordinary skill in the art at the time the invention was made to form the third electrical conductor having a desired thickness, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).
Wen et al. did not specifically teach the semiconductor substrate comprises silicon. However, Ito taught a semiconductor substrate (10) comprises silicon [see Figures 1 and 3, and Col. 8, lines 9-36]. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to form the semiconductor substrate of Wen et al. comprising silicon, such as taught by Ito because silicon is one of the materials that is commonly used to form the substrate.

With regard to claim 12, Wen et al. and Ito taught the substrate comprises silicon-on-sapphire substrate [see Col. 8, lines 9-36].

With regard to claim 13, Wen et al. and Ito taught the second electrical conductor is disposed over the first electric conductor [see Figures 8 and 13].

With regard to claim 15, Wen et al. and Ito taught each of the first and the second electrical conductors has a sheet resistivity, the sheet resistivity of the first electrical conductor being

approximately equal to the sheet resistivity of the second electrical conductor. Note that the first and the second conductors comprise the same material (copper), it is inherent that the sheet resistivity of the first conductor is approximately equal to that of the second conductor [see Col. 3, lines 5-14 and 53-65].

Response to Arguments

8. Applicant's arguments filed 06/30/03 have been fully considered but they are not persuasive.

It is argued, at the Remarks, that none of the cited arts teaches the third has a thickness in a range of approximately two and one-half to less than five microns, and consists essentially of one metal having a substantially uniform chemical composition, as recited in claims 1 and 9. This argument is not convincing because although Zhao et al and Wen et al. do not teach the thickness of the third electrical conductor, as that claimed by Applicants, however, it would have been obvious to one having ordinary skill in the art at the time the invention was made to form the third electrical conductor having a desired thickness, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). Further, Zhao et al. discloses, as shown in Col. 3, lines 40-41, the third electrical conductor consists essentially of one substantially uniform chemical composition (tungsten, aluminum or copper). Also Wen et al. discloses, as shown in Col. 3, lines 55-57, the third electrical conductor consists essentially of one substantially uniform chemical composition (tungsten, aluminum or copper). Therefore, Applicant's claims 1 and 9 do not distinguish over the Zhao et al. or Wen et al. references.

Conclusion

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hung K. Vu whose telephone number is (571) 272-1666. The examiner can normally be reached on Mon-Thurs 6:00-3:30, alternate Friday 7:00-3:30, Eastern Time.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie C. Lee can be reached on (571) 272-1732. The Central Fax Number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Vu

March 2, 2004

Hung Vu

Patent Examiner